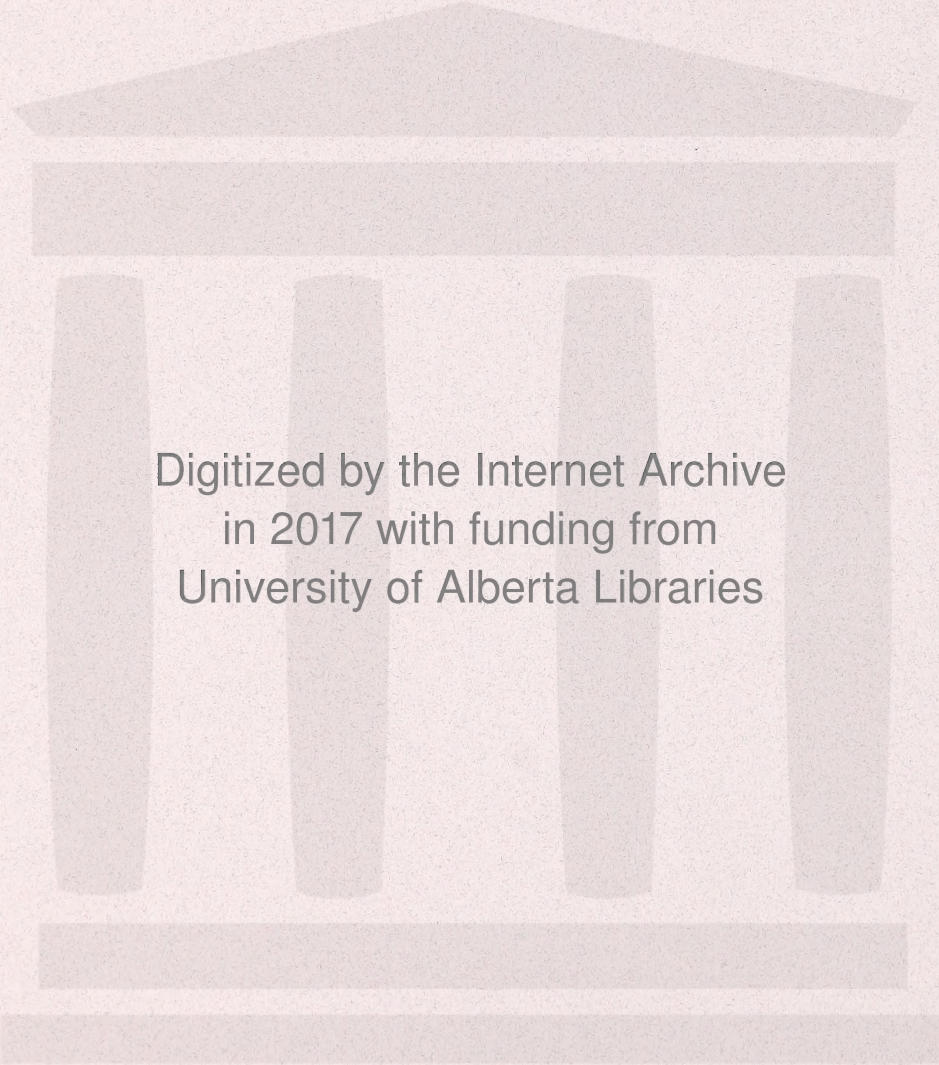


Occupational Injuries and Diseases in Alberta

Downhole and Other Oilfield Services 1997 to 2001

Upstream Oil and Gas Sub-Sector #5





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1. Introduction

Alberta Human Resources and Employment (AHRE) invests in people and workplaces. AHRE develops and delivers programs and services, which contribute to workplaces that are safe, healthy, fair and stable for employees and employers. Workplace Health and Safety is part of the continuum of services provided by Alberta Human Resources and Employment. The Department promotes the development of effective work site health and safety management systems and compliance programs and supports fair and effective resolution of workplace issues. AHRE works in partnership with Alberta Workers' Compensation Board (WCB), safety associations, employers, workers and labour to promote prevention of workplace injuries and diseases.

To this end, AHRE recognizes that monitoring workplace health and safety will help to ensure that primary concerns are actively managed and that resources are directed where needed. To parallel the increase in workforce covered by Alberta legislation, the number of Occupational Health and Safety officers dedicated to enforcement was increased. The officers are responsible for: ensuring that workers and employers are knowledgeable about Occupational Health and Safety Act; investigating serious incidents, fatalities and complaints; performing workplace inspections; and ensuring compliance with regulations if employers are found to be in violation.

Role of Alberta Human Resources and Employment

Workplace Health and Safety helps employers and workers ensure safe, healthy and productive workplaces in Alberta by:

- ◆ Providing workplace health and safety information and assistance to all Albertans.
- ◆ Investigating serious incidents and complaints about potential work site hazards.
- ◆ Partnering with industry leaders and safety associations to develop health and safety programs.
- ◆ Enforcing the *Occupational Health and Safety Act*.

This report summarises the lost-time injuries and disease descriptions, characteristics of the injured worker and the risk of injury to workers in Alberta's upstream oil and gas industries for the years 1997 to 2001. Cost of the injuries and revenue in terms of total premiums paid by employers are presented as well. Finally, a summary of occupational fatalities accepted by the WCB for compensation and brief descriptions of fatalities investigated by AHRE are also provided.

The purpose of this report is to provide government, employers, workers and health and safety officers in upstream oil and gas industries with information about the industry key health and safety issues.

Business Rules

Lost-Time Claim Rate

The lost-time claim rate can only be considered reliable for employers with 40 or more person years; it is recommended that the lost-time claim rate not be calculated based upon fewer than 40 person years.

Duration Rate

Duration rate is highly unstable when based on a few lost-time claims; it is recommended that the duration rate not be calculated based upon fewer than 30 lost-time claims.

Percent

Percents may not add up to a 100 because of rounding.

Description of Upstream Oil and Gas Industries

The upstream oil and gas industries can be subdivided into the following sub-sectors.

Exploration, Oilfield Maintenance and Construction, Well Servicing with Service Rigs including Power Swivels, Drilling of Oil and Gas Wells, Downhole and Other Oilfield Services, Tar Sands, Petroleum Producers, and Oilfield Trucking Services.

The next section gives the descriptions of the Downhole and Other Oilfield Services sub-sector.

2. Sub-Sector Description

Upstream Oil and Gas Sub-Sector #5: Downhole and Other Oilfield Services

i. Field Production Operators (Industry Code 06305)

This industry covers the “contract” operation of upstream oil and gas production and processing facilities not classified elsewhere. This is primarily a labour service contracted to oil and gas producers for the routine day to day operation of facilities such as those described in industry code 06300, including the operation of gas plants.

This is normally a daily responsibility. The duties of oil field production or gas well and battery operators will vary with different companies. Some may only be responsible for checking wellhead equipment. Others may work entirely at the battery and a majority of operators look after both wellhead and battery. If enhanced recovery methods are used on the well, Field Production Operators may operate these units in addition to their other duties.

Duties also include taking pressure and flow reading at the oil well, seeing equipment is running properly, checking flow lines, reading meters, looking for leaks, and may also involve working at the treater plant where samples may be required and reading needed on the levels of oil, gas, water and the addition of chemicals to the unit. At the water disposal unit, meters and gauges are checked, which measure pressure and water capacity levels to ensure there is sufficient space to hold the water coming in from the treating unit. At oil storage tanks, operators check pressure, storage capabilities and levels of the tanks. When gas is involved, operators check the Christmas tree, which controls the flow and pressure of the well. They inspect valves, take readings of gauges, temperature, pressure and flow rate.

The operators and their helpers are responsible for routine maintenance and light housekeeping duties only when a condition of the contract to operate the facility.

ii. Vacuum Removal of Waste-Industrial, Commercial and Oilfield (Industry Code 06306)

This industry includes the vacuum truck removal or recovery of industrial by-products, pollutants, hydrocarbons, toxic waste and other liquid waste from oil wells, gas wells, refineries, heavy oil extraction plants, chemical plants and other industrial plants sites. It also includes the cleaning up of fertilizer, grain, sulphur and other dry waste products from industrial and commercial sites such as elevators and rail car derailment sites. Septic tanks and farm waste removal is also part of this industry.

Equipment used ranges in size from a single axle truck with small tank storage and moderate pumping power, to tandem and larger trucks with larger tank capacity and powerful pumping units.

The major feature of this industry is to recover and remove products from an employer’s work site. The transportation of the product is an integral part of the services provided. This industry includes hydro-trenching and hydro-excavating where water is applied under pressure to the ground creating a mud/slurry which is simultaneously vacuumed up by a truck, equipped with both vacuum and water ejection apparatus and holding tank. The purpose is to expose pipe and utilities for further trenching and excavating without causing pipe ruptures.

iii. Mud Logging (Industry Code 09900)

Employers engaged in hydrocarbon well and mud logging are included in this industry. Hydrocarbon well/mud logging is a procedure used in oil field drilling to log the strata and other pertinent details on a well during the drilling process.

Drilling mud is a mixture of pulverized barite, clays, chemicals and other various substances. Mud tanks and pumps are used to circulate the mud down the well bore during drilling operation. In addition to bringing cuttings to the surface, drilling mud cools and lubricate the bit and drill stem, protect against blowouts by holding back subsurface pressures, and deposits a mud cake on the wall of the bore hole to prevent loss of fluids to the formation

A geological technician sets up at the drill site. Samples of drill cutting and gas, entrapped in the mud, are analyzed and the data recorded. They also analyze drill bit performance, rate of penetration and other information related to the drilling operations as required by the oil company. Log data and details are turned over to the oil companies for further study, and decisions concerning the drilling operations are made. Equipment used to conduct the analysis includes chromatographs, total gas analyzers, UV box (records ultra-violet light) and microscopes.

iv. Pressure Cleaning Services (Industry Code 09902)

These are mobile cleaning services conducted with the use of truck mounted tanks equipped with pressure pumps that eject water, steam, air or hot oil for industrial, commercial or oilfield cleaning purpose.

Industrial and commercial applications will be cleaning of dirt, oil, grease or debris from anything ranging from buildings and plant equipment to rail cars and mobile equipment as well as flushing sewers and drains.

In the oil field, high-pressure air, water or steam is used to remove sand, wax and other debris from well site production equipment and storage tanks. This industry also covers pressure services using steam and hot oil treatments to clean paraffin from well casing and includes flush by services where truck mounted masts are used to lift sucker rods to allow a flush of the well.

Hot oil, water and steam treatments can be used for thawing of oil field equipment, storage tanks as well as pipelines, water and sewer lines.

v. Rathole Drilling and Service Rig Anchoring (Industry Code 09904)

Prior to setting up a drilling rig to drill oil and gas wells it is necessary to drill a starter or conductor hole as well as holes for pipe stands known as rat and mouse holes. This is done with truck mounted drilling rigs. This industry is also used to cover the rig anchoring operations, which install ground anchors primarily to secure service rigs during operations, and also to secure flare stacks.

The oil company or contractor arranges site survey and access to the area, and indicates where the holes are to be drilled. Unlike drilling or service rigs, where sections of the drill stem are used, a one-piece truck mounted auger is used in these operations. Three holes are drilled from 16 to 36 inches in diameter depending on requirements.

A conductor hole is drilled to a depth of 30 to 40 feet (the deepest may be 60 feet, but this is rare). A 16 or 19 inch pipe, or casing is put into the hole and cemented around the outside to hold it in place. The conductor hole is the main drill hole that the drilling rigs start their drilling operations in.

Anchoring is relatively new industry, which was spawned by changes to safety regulations governing the set up of service rig. Rig anchoring services are completed with the use of truck-mounted equipment, which will screw an auger type piece of iron into the ground until solid base is reached. The anchor is pull tested at 15 to 20,000 pounds. Safety cables are then used to secure service rigs or flare stacks to the anchors. Anchoring companies do not usually fasten the cables.

vi. Oilfield Downhole Services (Industry Code 09911)

This industry covers a wide spectrum of oilfield downhole services related to well completion, stimulation, testing and wireline services. This industry does not cover well servicing operations with the use of well servicing rigs. Employers in this industry usually offer a multitude of the above service to their clients with a variety of equipment, downhole tools and truck-mounted units.

Services in this industry can include:

Directional drilling services involve only the supply of equipment and specialized supervision to the oil company. This work is done during the drilling process with the physical work or actual drilling done by the drilling crew.

Wireline services involve lowering special instruments into the well for testing purpose. A wireline may also be used to pull instrument or scrape debris out of the well.

Oil and gas well perforating involves lowering explosive device into the well on a wire line. When the required depth is reached, an electric current detonates the device. The explosive perforates the well casing, allowing the flow of oil at different levels.

Well testing activities include testing production levels. Production testing is performed by compressor equipment, usually truck mounted, which introduces water, air, or nitrogen into the line under high pressure and records information on pressure instruments. A separator may also be used to test flow or proportion of gas and oil and water in the flow.

Smaller hand held recording instruments may also be used for testing purposes. Dynamometers are surface instrument used to test downhole pumps and pump jack performance. Echometers are a downhole instrument used to log fluid levels and require the discharge of blank shell to generate shock waves, which are then recorded.

After a shot hole has been drilled, the hole is usually never used again and must be closed for environmental reasons. Shot hole cementers place a plug part way down the hole, then fill the hole with cement from the plug to the surface. Cementing also involves pumping cement downhole to secure the well casing.

Fracturing is the process of forcing, under high pressure, mud-sand slurry with carbon dioxide or nitrogen to expand or fracture the formation, allowing the oil or gas to escape the well.

Chemical treatments involve forcing and injecting stimulation fluids into the well casing to clear contaminants, remove paraffin and hydrates for well stimulation.

Under balanced drilling is a downhole process where lighter drilling fluids are used to lubricate the drilling bit and drill stem. The purpose of this process is to reduce cost and reduce the need for well stimulation in completing the well.

vii. Well Casing Services (Industry Code 09915)

This industry is intended to cover those employers who engage in a variety of services related functions on active drilling rigs.

Employers classified in this industry may engage in any one or more of the following activities:

Oil and Gas Well Power Tong Operations: These involve the use of large truck mounted hydraulic tongs to screw together or break apart sections of pipe (or casing) when being placed in, or removed from the drill hole.

Hydraulically operated Snubbing Units: Units are truck mounted and are used to move tubular products in and out of the oil or gas well, which has pressure at the surface ("live well"). There is a hydraulic jack which clamps on to the pipe to control and overcome the forces on the tubular goods exerted by the well bore pressure. By moving the jack up and down, and releasing and resetting the clamps, the tubulars can be put into or removed from the well bore. The second part of the snubbing units are the blowout preventers which are also hydraulically operated and are used to control the pressure on the well. Snubbing services are used primarily in work overs and well completions; however, drilling contractors may also require their services.

Cleaning of Pipe Threads at Well Site: Prior to the casing being placed in the well hole, the pipe threads must be cleaned. Well casing crews clean the pipe threads using varsol, wire brushes and rags.

Transport Pipe at Drill Site: Pipe or casing, found on a pipe rack approximately 100 feet away from the drilling rig, is transported to the rig floor by a carrier suspended on a wire cable running from a winch permanently mounted on a truck. These units used to transport the pipe are referred to as pickup and lay down units.

Torque Monitoring: Using a gauge or a computer monitoring system, the amount of torque applied when joining two joints of pipe together by means of power tong is monitored and controlled.

Employers that install blowout preventers are also included in this industry.

viii. Servicing Christmas Trees on Oil Wells by Means of a Tree Saver (Industry Code 09921)

An oil well “Christmas tree” is a series of pipes and valves that are situated on the wellhead after drilling of the well has been completed. This equipment needs to be protected when fracturing a well.

The tree saver is a heavy gauged piece of pipe (approximately 2 metres long, 5 centimetres in diameter and weighs 90 kilograms), which is inserted through the Christmas tree and into the well tubing to prevent the fracturing fluid from wearing away at the valves and parts of the Christmas tree. The saver is held in place by means of a bolted coupling and rubber sleeve.

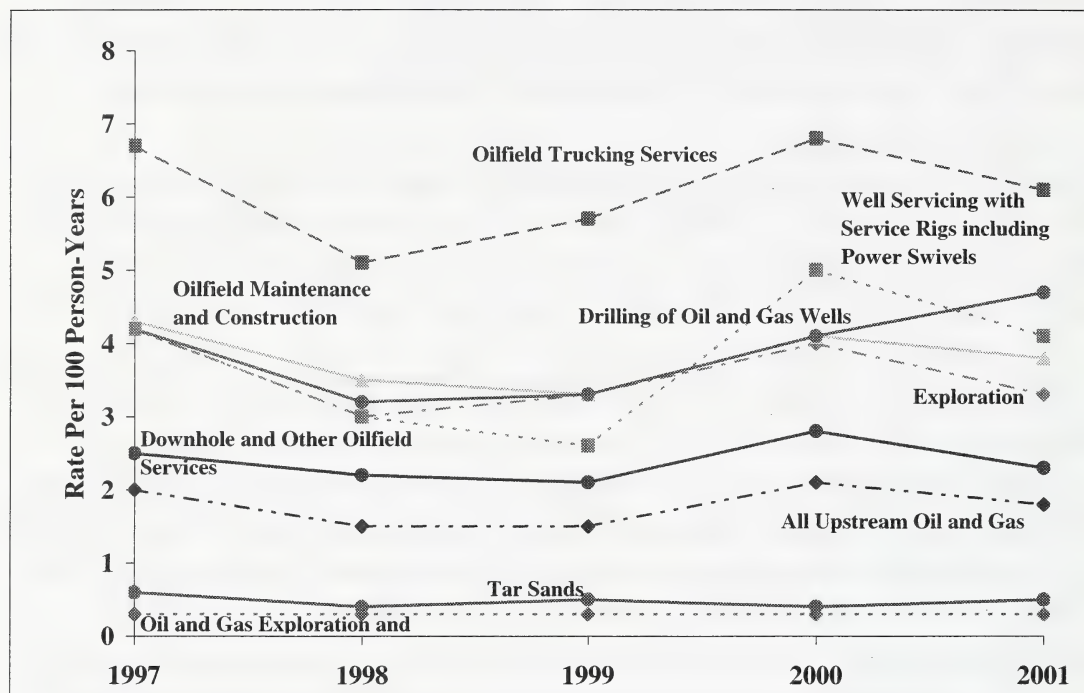
ix. Liquid Waste Treatment and Disposal (Industry Code 09927)

Employers in this industry are engaged in the chemical treatment and disposal of water in sump pits located on oil and gas well drilling sites. It should be noted that employers who pump water to the drilling rig, from a nearby water source, by means of pumps and irrigation piping are also classified in this industry. The equipment used is the same as that of employers pumping water out of a sump pit, and it is part and parcel of the water system used in the drilling process.

Samples of the sump water are analyzed by independent laboratories to determine what treatment program may be implemented so as to separate the solid wastes from the liquid, and to make the liquid safe for return to the environment. The Energy Resources Conservation Board prior to its implementation must approve the treatment program. Once the waste treatment company has applied the recommended program, they must then send in a sample of the treated sump liquid to the Energy Resources Conservation Board, who must verify that the treatment was successful. Once approved, the water is pumped out of the sump pit into the surrounding environment. The solid wastes are often not harmful to the environment, and therefore left in the sump pit.

Some employers will use a mechanical system (referred to as a centrifuge) through which they pump the sump pit waste in order to separate the solids from the liquids. Chemicals required to remove any impurities from the water are added to the system. The same Energy Resources Conservation Board standards discussed above must be adhered to.

Lost-Time Claim Rate **Upstream Oil and Gas Sub-Sectors** **Alberta: 1997-2001**



Lost-Time Claim Rate	1997	1998	1999	2000	2001
All Upstream Oil and Gas	2.0	1.5	1.5	2.1	1.8
Exploration	4.2	3.0	3.3	4.0	3.3
Oilfield Maintenance and Construction	4.3	3.5	3.3	4.1	3.8
Well Services with Service Rigs	4.2	3.2	3.3	4.1	4.7
Drilling of Oil and Gas	4.2	3.0	2.6	5.0	4.1
Downhole and Other Oilfield Services	2.5	2.2	2.1	2.8	2.3
Tar Sands	0.6	0.4	0.5	0.4	0.5
Oil and Gas Exploration and Development	0.3	0.3	0.3	0.3	0.3
Oilfield Trucking Services	6.7	5.1	5.7	6.8	6.1

3.Lost-Time Claim Rate and Duration Rate

Downhole and Other Oilfield Services

Year	# of Accounts	Cost	Person Years	Days Lost	Duration Rate	LTCs	LTC Rate
1997	2,590	\$2,652,673	17,275	14,949	87	438	2.5
1998	2,942	\$3,959,219	17,374	19,077	110	388	2.2
1999	3,205	\$2,210,463	16,304	13,733	84	343	2.1
2000	3,635	\$2,968,770	17,343	18,187	105	482	2.8
2001	4,153	\$4,248,222	20,546	22,880	111	472	2.3

3.1 Lost-Time Claim Rate by Industry Code

06305-Field Production Operators

Year	# of Accounts	Cost	Person Years	Days Lost	Duration Rate	LTCs	LTC Rate
1997	1,058	\$230,267	1,626	659	N/A	21	1.3
1998	1,197	\$182,036	1,783	1,055	N/A	27	1.5
1999	1,295	\$405,866	1,782	966	N/A	21	1.2
2000	1,488	\$225,546	1,770	876	N/A	28	1.6
2001	1,802	\$483,159	2,547	2,448	96	40	1.6

06306-Vacuum Removal of Waste-Industrial, Commercial and Oilfield

Year	# of Accounts	Cost	Person Years	Days Lost	Duration Rate	LTCs	LTC Rate
1997	415	\$403,141	1,105	2,187	198	57	5.2
1998	479	\$300,782	1,163	2,605	224	55	4.7
1999	489	\$236,272	1,105	2,810	254	58	5.2
2000	522	\$435,570	1,494	4,245	284	78	5.2
2001	577	\$866,908	1,703	5,259	309	78	4.6

09900-Mud Logging

Year	# of Accounts	Cost	Person Years	Days Lost	Duration Rate	LTCs	LTC Rate
1997	18	\$6,319	142	34	N/A	2	1.4
1998	22	\$5,057	148	64	N/A	1	0.7
1999	31	\$14,120	137	165	N/A	2	1.5
2000	33	\$17,726	158	108	N/A	3	1.9
2001	41	\$9,725	173	78	N/A	2	1.2

09902-Pressure Cleaning Services

Year	# of Accounts	Cost	Person Years	Days Lost	Duration Rate	LTCs	LTC Rate
1997	437	\$265,688	1,428	2,088	146	44	3.1
1998	471	\$462,280	1,327	2,764	208	53	4.0
1999	466	\$274,551	1,299	1,380	106	52	4.0
2000	494	\$361,445	1,446	1,916	133	61	4.2
2001	519	\$355,032	1,806	2,526	140	61	3.4

09904-Rathole Drilling and Services Rig Anchoring

Year	# of Accounts	Cost	Person Years	Days Lost	Duration Rate	LTCs	LTC Rate
1997	63	\$35,475	290	321	N/A	9	3.1
1998	59	\$107,491	206	608	N/A	7	3.4
1999	62	\$16,448	195	160	N/A	4	2.1
2000	70	\$68,489	206	499	N/A	8	3.9
2001	71	\$108,145	188	897	N/A	11	5.9

09911-Oilfield Downhole Services

Year	# of Accounts	Cost	Person Years	Days Lost	Duration Rate	LTCs	LTC Rate
1997	455	\$1,373,126	12,077	7,751	64	268	2.2
1998	546	\$2,601,897	12,156	10,356	85	223	1.8
1999	688	\$1,059,379	11,224	6,050	54	180	1.6
2000	835	\$1,542,897	11,549	8,389	73	260	2.3
2001	934	\$2,207,226	13,460	10,286	76	254	1.9

09915-Well Casing Services

Year	# of Accounts	Cost	Person Years	Days Lost	Duration Rate	LTCs	LTC Rate
1997	110	\$307,372	386	1,606	416	30	7.8
1998	124	\$294,471	374	1,573	N/A	21	5.6
1999	135	\$202,273	321	2,179	N/A	23	7.2
2000	148	\$295,520	479	1,972	412	39	8.1
2001	164	\$133,123	373	836	N/A	22	5.9

09921-Servicing Christmas Trees on Oil Wells by Means of a Tree Saver

Year	# of Accounts	Cost	Person Years	Days Lost	Duration Rate	LTCs	LTC Rate
1997	9	\$7,413	133	71	N/A	2	1.5
1998	10	\$0	121	0	N/A	0	0.0
1999	9	\$659	123	8	N/A	1	0.8
2000	15	\$7,245	127	61	N/A	1	0.8
2001	13	\$0	169	0	N/A	0	0.0

09927-Liquid Waste Treatment and Disposal

Year	# of Accounts	Cost	Person Years	Days Lost	Duration Rate	LTCs	LTC Rate
1997	25	\$23,873	88	232	N/A	5	5.7
1998	34	\$5,204	97	52	N/A	1	1.0
1999	30	\$894	118	15	N/A	2	1.7
2000	30	\$14,332	115	121	N/A	4	3.5
2001	32	\$84,902	128	550	N/A	4	3.1

3.2 Lost-Time Claim Rate by Size of Employer: 2001

Size of Employer	# of Accounts	LTCs	Person - Years	LTC Rate
A: Less than 1 person-years	2,418	26	1,167	2.2
B: 1 to 4 person-years	1,313	64	2,388	2.7
C: 5 to 9 person-years	192	46	1,330	3.5
D: 10 to 19 person-years	116	64	1,660	3.9
E: 20 to 39 person-years	61	52	1,761	3.0
F: 40 to 99 person-years	26	36	1,462	2.5
G: 100 or more person-years	26	180	10,778	1.7
H: Unspecified	1	4	N/A	N/A
Total	4,153	472	20,546	2.3

4. Analysis of the Lost-Time Claims

4.1 Nature of Injury

LOST-TIME CLAIMS ALBERTA: 1997 TO 2001	OCCURRENCE YEAR					Total	
	1997	1998	1999	2000	2001	Number	Percent
SPRAIN, STRAIN, TEARS	192	150	126	179	173	820	38.6
FRACTURE/DISLOCATION	70	82	53	73	94	372	17.5
OTHER TRAUMATIC INJURY/DISEASE	33	34	49	89	69	274	12.9
SURFACE WOUNDS, BRUISES	53	38	31	51	44	217	10.2
OPEN WOUNDS	33	34	25	35	27	154	7.3
BURNS	18	24	22	28	27	119	5.6
SYSTEMATIC DISEASES, DISORDERS	13	14	15	15	23	80	3.8
NATURE - UNS	15	7	17	11	15	65	3.1
MULTIPLE DISEASE/DISORDERS	11	5	4	.	.	20	0.9
OTHER DISEASE/DISORDERS	.	.	1	.	.	1	0.0
INFECTIOUS/PARASITIC DISEASE	.	.	.	1	.	1	0.0
Total	438	388	343	482	472	2,123	100.0

4.2 Type of Event or Exposure

LOST-TIME CLAIMS ALBERTA: 1997 TO 2001	OCCURRENCE YEAR					Total	
	1997	1998	1999	2000	2001	Number	Percent
OVEREXERTION	88	73	59	87	68	375	17.7
STRUCK BY OBJECTS	60	61	39	60	71	291	13.7
TRANSPORTATION ACCIDENTS	64	42	44	61	54	265	12.5
BODILY REACTION	42	42	36	41	56	217	10.2
FALL ON SAME LEVEL	26	30	24	53	50	183	8.6
FALL TO LOWER LEVEL	39	30	30	26	31	156	7.3
CAUGHT IN OBJECTS	37	24	20	36	28	145	6.8
EXPOSURE TO HARMFUL SUBSTANCES	22	25	24	25	28	124	5.8
STRUCK AGAINST OBJECTS	9	11	13	19	11	63	3.0
OTHER FALLS	9	8	6	15	12	50	2.4
FIRES AND EXPLOSIONS	3	7	10	10	10	40	1.9
RUBBED OR ABRADED	9	4	3	2	1	19	0.9
OTHER BODILY REACTION/EXERTION	1	2	4	5	3	15	0.7
REPETITIVE MOTIONS	1	1	3	3	6	14	0.7
OTHER CONTACT WITH OBJECT/EQUIP	.	6	2	.	.	8	0.4
OTHER ASSAULTS/VIOLENT	2	1	.	.	.	3	0.1
ASSAULT/VIOLENT ACT BY PERSON	.	.	1	.	1	2	0.1
UNKNOWN	26	21	25	39	42	153	7.2
Total	438	388	343	482	472	2,123	100.0

4.3 Part of Body Injured

LOST-TIME CLAIMS ALBERTA: 1997 TO 2001	OCCURRENCE YEAR					Total	
	1997	1998	1999	2000	2001	Number	Percent
BACK	126	93	73	114	94	500	23.6
OTHER TRUNK	51	50	48	70	71	290	13.7
ANKLE(S) & FOOT(FEET)-NOT TOES	34	47	45	61	66	253	11.9
MULTIPLE BODY PARTS	33	27	51	45	51	207	9.8
LEG(S)	42	32	32	47	50	203	9.6
FINGER(S)	33	37	26	36	41	173	8.1
HAND(S)	34	27	15	22	22	120	5.7
OTHER HEAD	25	30	11	30	22	118	5.6
OTHER UPPER EXTREMITIES	16	12	16	22	23	89	4.2
NECK	24	11	11	11	9	66	3.1
EYE(S)-OPTIC NERVE,VISION	12	9	8	15	11	55	2.6
OTHER LOWER EXTREMITIES	5	8	3	6	8	30	1.4
BODY SYSTEMS	2	4	2	1	4	13	0.6
UNKNOWN	1	1	2	2	.	6	0.3
Total	438	388	343	482	472	2,123	100.0

4.4 Source of Injury

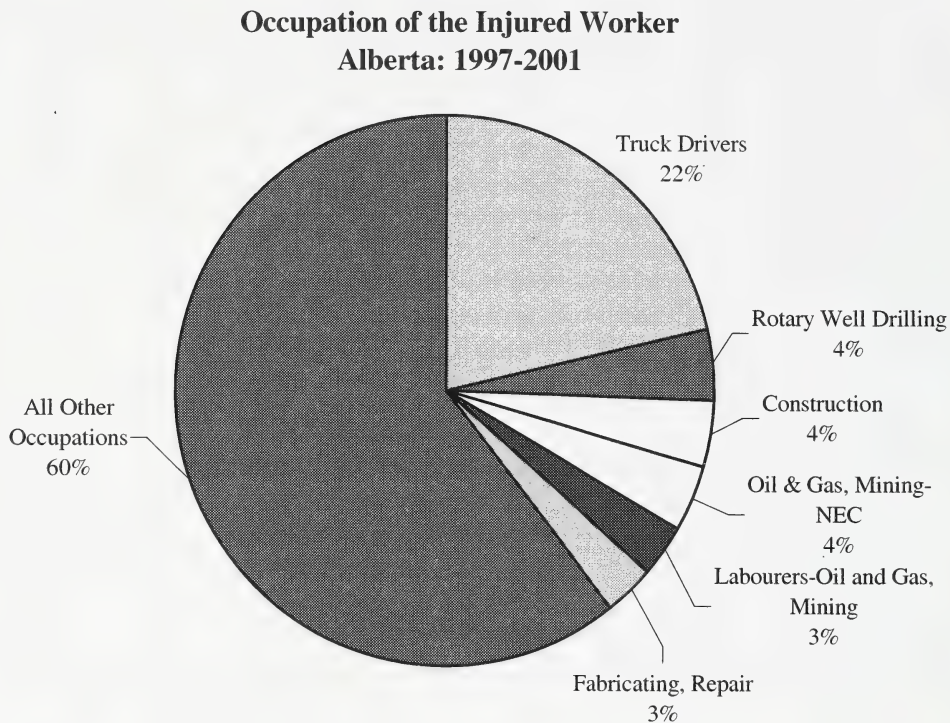
LOST-TIME CLAIMS ALBERTA: 1997 TO 2001	OCCURRENCE YEAR					Total	
	1997	1998	1999	2000	2001	Number	Percent
VEHICLES	77	53	50	68	60	308	14.5
PARTS & MATERIALS	54	59	49	73	66	301	14.2
STRUCTURES/SURFACES	61	46	47	76	70	300	14.1
PERSONS-INJURED WORKER	43	45	41	49	65	243	11.4
CONTAINERS	36	29	17	34	30	146	6.9
OTHER SOURCES	15	20	27	30	30	122	5.7
HANDTOOLS-UNPOWERED	20	18	13	14	13	78	3.7
MACHINERY	14	15	7	16	13	65	3.1
OTHER TOOLS/EQUIPMENT	15	11	7	12	16	61	2.9
CHEMICAL/CHEMICAL PRODUCTS	16	14	8	8	11	57	2.7
FURNITURE & FIXTURES	5	.	1	4	4	14	0.7
MINERAL-METALS/NONMETALS	4	3	.	3	4	14	0.7
HANDTOOLS-POWERED	4	2	3	2	1	12	0.6
PERSONS-NOT THE INJURED WORKER	2	.	2	1	1	6	0.3
PLANTS & ANIMALS	1	1	.	1	2	5	0.2
OTHER PLANTS/ANIMALS/MINERALS	.	1	.	2	.	3	0.1
UNKNOWN	71	71	71	89	86	388	18.3
Total	438	388	343	482	472	2,123	100.0

4.5 Duration of Disability

LOST-TIME CLAIMS ALBERTA: 1997 TO 2001	OCCURRENCE YEAR					Total	
	1997	1998	1999	2000	2001	Number	Percent
01 - 05 DAYS LOST	115	98	88	124	92	517	24.4
06 - 10 DAYS LOST	71	55	45	66	68	305	14.4
11 - 15 DAYS LOST	37	33	34	39	44	187	8.8
16 - 20 DAYS LOST	19	19	16	30	25	109	5.1
21 - 30 DAYS LOST	35	27	34	45	41	182	8.6
31 - 40 DAYS LOST	25	21	11	25	31	113	5.3
41 - 50 DAYS LOST	21	24	13	15	26	99	4.7
51 OR MORE DAYS LOST	94	93	78	106	123	494	23.3
DAYS LOST-UNSPECIFIED	21	18	24	32	22	117	5.5
Total	438	388	343	482	472	2,123	100.0

5. Characteristics of the Injured Worker

5.1 Occupation of the Injured Worker



5.2 Age of Injured Worker

LOST-TIME CLAIMS ALBERTA: 1997 TO 2001	OCCURRENCE YEAR					Total	
	1997	1998	1999	2000	2001	Number	Percent
15-19 YEARS	14	11	13	30	20	88	4.1
20-24 YEARS	88	68	74	91	88	409	19.3
25-34 YEARS	158	144	109	170	175	756	35.6
35-44 YEARS	132	116	103	121	128	600	28.3
45-54 YEARS	35	35	37	52	42	201	9.5
55-64 YEARS	10	12	6	17	18	63	3.0
65 YEARS AND OVER	1	2	1	1	1	6	0.3
Total	438	388	343	482	472	2,123	100.0

5.3 Length of Time Employed

LOST-TIME CLAIMS ALBERTA: 1997 TO 2001	OCCURRENCE YEAR					Total	
	1997	1998	1999	2000	2001	Number	Percent
A. LESS THAN 1 MONTH	41	34	23	43	41	182	8.6
B. 1 MONTH TO LESS THAN 6 MONTHS	113	92	69	119	85	478	22.5
C. 6 MONTHS TO LESS THAN 1 YEAR	55	57	26	65	56	259	12.2
D. 1 YEAR OR MORE	119	109	125	127	107	587	27.6
E. TIME-UNSPECIFIED	110	96	100	128	183	617	29.1
Total	438	388	343	482	472	2,123	100.0

5.4 Gender of Injured Worker

LOST-TIME CLAIMS ALBERTA: 1997 TO 2001	OCCURRENCE YEAR					Total	
	1997	1998	1999	2000	2001	Number	Percent
MALE	427	375	329	469	457	2,057	96.9
FEMALE	5	7	9	9	10	40	1.9
GENDER-UNSPECIFIED	6	6	5	4	5	26	1.2
Total	438	388	343	482	472	2,123	100.0

6. Cost of Claims and Employer Premiums

Upstream Oil and Gas Sub-Sector #5: Downhole and Other Oilfield Services

Transaction Year	Occurrence Year				
	1997	1998	1999	2000	2001
1997	\$2,293,054				
1998	\$1,111,350	\$2,777,603			
1999	\$428,341	\$1,698,892	\$2,420,128		
2000	\$788,195	\$980,749	\$1,303,332	\$2,376,521	
2001	\$614,685	\$1,073,735	\$794,359	\$2,723,859	\$3,127,463
Total Cost	\$5,235,627	\$6,530,978	\$4,517,819	\$5,100,380	\$3,127,463
Total Premiums	\$11,773,958	\$8,324,444	\$6,324,545	\$10,283,985	\$12,695,093

The above claim cost and employer premiums are for the five-year period 1997 through 2001. The data are as of May 4, 2002.

The claim cost reflects only paid cost on lost-time claims that occurred in the five-year period. These costs are tracked by year of occurrence and the year that the costs were transacted.

The premiums are the total of all employers' premiums paid in each year and are calculated by the rate year.

7. Occupational Fatalities

An occupational fatality is the death of a worker that results from a work-related event or exposure. AHRE classifies occupational fatalities into three general types: motor vehicle incident, workplace incident and occupational diseases. Each is described in detail below.

Motor Vehicle Incident

Motor vehicle incidents typically involve highway vehicles operating on public roads in which the fatally injured worker was either the driver or a passenger. This category also includes fatalities involving aircraft crashes, train crashes, helicopter crashes, and water vehicle crashes.

Workplace Incident

Fatal workplace incidents consist of cases in which the worker dies at a work site, or as a result of injuries sustained at a work site. It is this type of fatality that AHRE may be responsible for investigating.

Occupational Diseases

Occupational disease fatalities consist mostly of recognized occupational disease, that is, disease known to be primarily or exclusively work-related (e.g., asbestosis, black lung disease). Occupational diseases are frequently diagnosed many years after the initial or crucial exposure to the toxic substance, and in such cases it is very difficult to determine when the fatal exposure occurred. Thus, the occupational disease category should not be interpreted to reflect present work site hazardous conditions or exposures.

Each year the WCB accepts some occupational fatality claims for compensation. Occupational fatality claims that were accepted in a particular year may include fatalities from prior years.

Description of Oilfield Downhole Services Workplace Fatalities Accepted by the Workers' Compensation Board Alberta: 1997-2001

YEAR	Motor Vehicle Incidents		Workplace Incidents		Total	
	N	%	N	%	N	%
1997	4	80.0	1	20.0	5	100
1998	3	60.0	2	40.0	5	100
1999	1	25.0	3	75.0	4	100
2000	1	100.0	0	0	1	100
2001	0	0	2	100.0	2	100
Total	9	52.9	8	47.1	17	100

8. Description of Workplace Fatalities Investigated by Occupational Health and Safety: 1997 to 2001

YEAR:	1997	FILE:	0872
OCCUPATION:	Truck Driver	AGE:	33
INDUSTRY:	Field Production Operators		
EXPERIENCE:	one week with company		

DESCRIPTION: The driver was employed with the trucking company to haul methanol to gas leases. The driver attempted to enter the gas lease and his truck became stuck. The lease operator radioed for a caterpillar to pull the truck out. The lease operator and the driver unloaded the methanol and the former left to perform other duties. The cat operator arrived and proceeded to unload the cat off the truck and then backed down the road a short distance. He moved the cat forward through a ditch and a grassy area to the front of the methanol truck. As he manoeuvred the cat in front of the truck, he saw a dark form on the grass. Upon checking, he discovered that the truck driver had been run over by the caterpillar.

YEAR:	1998	FILE:	0909
OCCUPATION:	Cement Acid Pumper/Driver	AGE:	29
INDUSTRY:	Oilfield Downhole Services		
EXPERIENCE:	11 months with employer		

DESCRIPTION: A worker was found dead in a trench. The worker was one of the two individuals monitoring a pipeline freeze plug operation. Between 25 and 45 minutes after the worker entered the trench, he was found frozen by the other worker and a relief crew. The reason for the worker entering the trench is not known. The purpose of the trench was to expose a section of oil pipeline so that it could be tested for leaks. The pipeline was filled with water to prepare for the leak test. Liquid nitrogen was flowing from a nearby bulk truck through a freeze plug jacket surrounding the pipe. The cold liquid nitrogen on the outside of the pipe froze the water inside the pipe, creating a plug of ice. The freeze plug process created an atmosphere cold enough to freeze the soil in the base of the trench.

YEAR:	1999	FILE:	932
OCCUPATION:	Relief Operator	AGE:	24
INDUSTRY:	Field Production Operators		
EXPERIENCE:	3 years		

DESCRIPTION: The relief operator and a site consultant noticed a cloud of vapours, steam and smoke rising out of the group treater area at the battery site. The relief operator drove his truck to the battery site to investigate, followed by the site consultant in his own truck. When the relief operator entered the test treater building, the group treater vessel located beside the building exploded and an ensuing fire occurred. The site consultant was forced to retreat as a fireball was shooting towards him. The test treater building was destroyed. The site consultant called Emergency Medical Services. It took approximately 20 minutes to contain the fire. The relief operator received severe burn injuries and was pronounced dead at the scene.

YEAR: 1999
OCCUPATION: Operations Manager
INDUSTRY: Oilfield Downhole Services
EXPERIENCE: 25 years

FILE: 0943
AGE: 48

OCCUPATION: Labourer
INDUSTRY: Oilfield Downhole Services
EXPERIENCE: 3 months

AGE: 19

DESCRIPTION: An Operations Manager and a labourer were welding an overflow pipe on top of a tank that contained residual flammable materials. During the welding operation the welding spark ignited the flammable materials causing the tank to explode. Both the Operations Manager and the labourer received fatal injuries as a result of the explosion.

Note: There was one fatality in 2001 that is still under investigation.

Appendix A: Terms, Definitions, and Formulas

Lost-Time Claim A lost-time claim (LTC) is a claim for an occupational injury or disease, which disables the worker beyond the day of injury. Included are claims for which wages compensation are paid, permanent disability claims, fatalities, and cases in which the injured worker is assigned light duties or other modified work.

Person-Years Person-year estimates are calculated from wage and payroll data provided by account holders to the WCB. Alberta Human Resources and Employment uses these data to estimate an average industry wage, and uses the average industry wage and employer payroll data to estimate person-years for each employer and each industry. One person-year is equivalent to one full-time worker working for one year, and can be assumed to equal 2,000 hours worked.

LTC Rate The lost-time claim (LTC) rate is calculated by dividing the number of lost-time claims by the person-year estimate, and multiplying the result by 100. The LTC rate represents the probability or risk of disabling injury or disease to a worker during a period of one-year work. Comparisons of LTC rates between industries, or between years, can be used to indicate increases, decreases, or differences in this risk.

$$\text{LTC Rate} = \frac{\text{Number of LTCs} \times 100}{\text{Estimated Person-years}}$$

Duration (Days Lost) The duration of disability is the number of days following the injury or disease for which the worker was disabled, and unable to perform normal work duties. This information is obtained for this report from data on compensation days paid on each claim from WCB. Alberta Human Resources and Employment obtains these data on March 31 of the year following the claim year, and does not update the information, even though many injured workers continue to be disabled beyond this date. As a result, the duration information reported here underestimates the true impact of lost-time injury and disease.

Duration Rate The duration rate is calculated by dividing the number of workdays lost (disability days) by the person-year estimate, and multiplying by 100. The result is expressed as days lost per 100 person-years worked, and indicates, in part, the economic impact of occupational injury and disease. Duration rates are not recommended as reliable indicators of full economic cost. In addition, readers are warned that duration rates are highly unstable when based on only a few lost-time claims; it is recommended that the duration rate not be calculated based upon fewer than 30 lost-time claims.

$$\text{Duration Rate} = \frac{\text{Disability Days} \times 100}{\text{Estimated Person-years}}$$

WCB Accepted Fatality An occupational fatality is the death of a worker which resulted from a work-related incident or exposure and which has been accepted by the WCB for compensation. A fatality is counted in the year it is accepted.

NEC Means 'Not Elsewhere Classified'.

UNS Means 'Unspecified'.

Appendix B: Upstream Oil and Gas 2001 Industry Codes

<u>Sub-Sector #1:</u>	Exploration
Industries:	09200-Seismic Geophysical and Mineral Exploration 09201-Shot Hole Drilling
<u>Sub-Sector #2:</u>	Oilfield Maintenance and Construction
Industries:	06304-Oilfield Construction and Maintenance (Upstream of Processing Plants)
<u>Sub-Sector #3:</u>	Well Servicing with Service Rigs
Industries:	09903-Well Servicing with Service Rigs including Power Swivels
<u>Sub-Sector #4:</u>	Drilling of Oil and Gas Wells
Industries:	09600-Drilling of Oil and Gas Wells
<u>Sub-Sector #5:</u>	Downhole and Other Oilfield Services
Industries:	06305-Field Production Operators 06306-Vacuum Removal of Waste-Industrial, Commercial and Oilfield 09900-Mud Logging 09902-Pressure Cleaning Services 09904-Rathole Drilling and Service Rig Anchoring 09911-Oilfield Downhole Services 09915-Well Casing Services 09921-Servicing Christmas Trees on Oil Wells by Means of a Tree Saver 09927-Liquid Waste Treatment and Disposal
<u>Sub-Sector #6:</u>	Tar Sands
Industries:	06600-Mining and Processing of Bituminous Sand for Oil Extraction 06601-Research and Development, Oil Sands and Heavy Oil Recovery
<u>Sub-Sector #7:</u>	Oil and Gas Exploration and Development
Industries:	06300-Oil and Gas Exploration and Development-Upstream Operations
<u>Sub-Sector #8:</u>	Oilfield Trucking Services
Industries:	50720-Oilfield Trucking Services

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Alberta Workplace Health and Safety website:
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